

Application No.: 10/002560

Case No.: 56911US002

**Remarks**

Independent claims 1, 23, and 34 have been amended to state that the cooling step is carried out by contacting the stem web against a cooled roll, wherein the cooled roll has a diameter that is at least 30% larger than the first nip roll to facilitate rapid cooling of the stem web. Support for these amendments may be found in original claims 4, 7, 27, 30, 35, and 38. Claims 5, 8, 10, 28, 31, and 36 have been amended to change dependency from a cancelled claim to a pending claim. Claims 36, 37, and 39 have been amended to remove the word "heated" which lacks antecedent basis. Claims 4, 7, 9, 27, 30, 32, 35, and 38 have been canceled, and claims 13-22 have been withdrawn from consideration. Thus, claims 1-3, 5, 6, 8, 10-12, 23-26, 28, 29, 31, 33, 34, 36, 37, 39, and 40 are presently at issue in the pending application.

**§ 112 Rejections**

Claims 7, 8, 30, 31, 38, and 39 are rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. The claims have also been objected to under 37 CFR 1.75(c) as being of improper dependent form. In making the rejection, the Examiner states that the claims add an apparatus limitation which does not affect the process. Claims 8, 31 and 39 have been amended to state that the larger diameter of the cooling roll relative to the nip roll facilitates rapid cooling of the stem web. Support for this amendment may be found in the specification at page 7, lines 21-24. Claims 7, 30 and 38 have been cancelled, thus obviating the rejection as to these claims.

Accordingly, Applicants submit that the rejection of claims 7, 8, 30, 31, 38, and 39 under 35 USC § 112, second paragraph, has been overcome, and that the rejection should be withdrawn.

The present invention is directed to a method capping a stem web and a method for making an abrasive article. The methods of the present invention enable a stem web to be prepared in greater widths and at greater line speeds than previously possible. The method includes passing a stem web with a plurality of stems having a diameter "d" through a first nip to partially cap the stems, cooling the web by contacting the stem web against a cooled roll, and

Application No.: 10/002560

Case No.: 56911US002

passing the stem web through a second nip to completely cap the stems to a diameter "D", wherein the capped stems have a D:d ratio of at least 1.5:1, and wherein the cooled roll has a diameter that is at least 30% larger than the diameter of the first nip roll to facilitate rapid cooling of the stem web.

### § 102 Rejections

Claims 1-6, 10, 23, 24, 26-29, and 35-37 are rejected under 35 USC § 102(e) as being anticipated by Braunshweig et al. (U.S. Patent 6, 197,076).

Claim 1 of the present invention, as amended, is directed to a method for capping a stem web, the stem web having a backing and a plurality of stems having a diameter "d" extending from the backing, the method comprising: passing the stem web through a first nip against a first heated nip roll so as to partially cap the stems; cooling the stem web by contacting the stem web against a cooled roll; and passing the stem web through a second nip against a surface of a second heated nip roll to completely cap the stems to a diameter "D", wherein the capped stems have a D:d ratio of at least 1.5:1, and wherein the cooled roll has a diameter that is at least 30% larger than the diameter of the first heated nip roll to facilitate rapid cooling of the stem web.

Claim 23 of the present invention, as amended, is directed to a method for making an abrasive article, the method comprising: providing a stem web comprising a backing having a first and second opposite major surfaces, and a plurality of stems having a diameter "d" and extending from at least a portion of the first major surface of the backing; passing the stem web through a first nip against a first heated nip roll so as to partially cap the stems; cooling the web by contacting the stem web against a cooled roll; passing the stem web through a second nip against a second heated nip roll so as to completely cap the stems to a diameter "D", wherein the capped stems have a D:d ratio of at least 1.5:1, and wherein the cooled roll has a diameter that is at least 30% larger than the diameter of the first heated nip roll to facilitate rapid cooling of the stem web; and applying an abrasive layer onto at least a portion of the second major surface.

Claim 34 of the present invention, as amended, is directed to a method for capping a stem web, the stem web having a backing and a plurality of stems having a diameter "d" extending from the backing, the method comprising: passing the stem web through a first nip so as to partially cap the stems; cooling the stem web by contacting the stem web against a cooled roll;

Application No.: 10/002560

Case No.: 56911US002

and passing the stem web through a second nip to completely cap the stems to a diameter "D", wherein the capped stems have a D:d ratio of at least 1.5:1, and wherein the cooled roll has a diameter that is at least 30% larger than the diameter of the first nip roll to facilitate rapid cooling of the stem web.

Braunshweig et al. discloses a method of making an abrasive article which includes the step of capping a stem web utilizing a set of three rollers of equal diameter, wherein nip gaps between adjacent rolls are used to cap the web of stem material (see, Braunshweig et al. at column 13, lines 36-38, and Figs. 2 & 3).

Independent claims 1, 23 and 34 of the present application have been amended to describe the cooled roll as having a diameter that is at least 30% larger than the diameter of the first nip roll to facilitate rapid cooling of the stem web. Braunshweig et al. does not teach or suggest the use of a cooling roll having a diameter that is at least 30% larger than the diameter of the first nip roll.

Applicants have developed a method and apparatus for capping a wide stem web at line speeds previously unattainable. Applicants have achieved this result by designing a system of nip and cooling rolls, wherein a central cooling roll has a larger diameter than an adjacent nip roll. The larger diameter of the cooling roll relative to, for example, the first nip roll, enables the partially capped stem web, after exiting the first nip, to be rapidly cooled so that the stems that were warm and weak after passing the first nip regain their strength before entering the second nip. The configuration of the capping apparatus utilized in the method of the present invention facilitates efficient processing of wide stem webs at fast line speeds. The prior art does not teach or suggest the configuration of the capping apparatus utilized in the method of the present invention.

Independent claims 1, 23, and 34 are not anticipated by Braunshweig et al. for the reasons stated above. The dependant claims of claims 1, 23 and 34, each add additional features to those claims; thus, their respective dependant claims are also not anticipated.

Applicants assert that the rejection of claims 1-6, 10, 23, 24, 26-29, and 35-37 under 35 USC § 102(e) as being anticipated by Braunshweig et al. has been overcome and should be withdrawn.

Application No.: 10/002560

Case No.: 56911US002

**§ 103 Rejections**

Claims 7, 8, 30, 31, 38 and 39 were rejected under 35 USC § 103(a) as being unpatentable over Braunshweig et al. The Examiner states that the recited structural limitation of the cooling roll having a diameter that is 30% larger than an adjacent nip roll, is an apparatus limitation that does not affect the method.

In reference to the 30% larger diameter of the cooling roll, the Examiner further states that the limitation "appears to be a mere and obvious matter of design choice depending upon the capital equipment on hand in order to keep new costs to a minimum." (see Office Action, page 6, first full paragraph; page 8, first two lines; and page 9, first paragraph.) To the contrary, Applicants have found that prior art equipment configurations, such as those described in Braunschweig et al. and Figure 1a of the present application, were incapable of processing wide webs at fast line speeds. The equipment configuration described in the method of the present invention was the result of extensive design efforts on the part of the Applicants specifically targeted toward capping wide stem webs at faster line speeds than had been previously possible.

Claims 8, 31 and 39 have been amended to further describe the effect of the size of the cooling roll on the method. Specifically, claims 8, 31 and 39 have been amended to further describe that the 30% larger diameter of the cooling roll facilitates rapid cooling of the stem web. Claims 7, 30 and 38 have been cancelled, thus obviating the rejection as to these claims.

Claim 9 are rejected under 35 USC § 103(a) as being unpatentable over Braunshweig et al. in view of Chesley et al. Claim 9 has been cancelled, thus obviating the rejection under 35 USC § 103(a).

Claims 11 and 33 are rejected under 35 USC § 103(a) as being unpatentable over Braunshweig et al. in view of Harvey et al. (U.S. Patent 6,660,121). Claim 11 ultimately depends on claim 1, and claim 33 ultimately depends on claim 23. Claims 1 and 23 have been amended, as explained above, to describe the cooled roll as having a diameter that is at least 30% larger than the diameter of the first nip roll to facilitate rapid cooling of the stem web. Braunshweig et al. does not teach or suggest the use of a cooling roll having a diameter that is at least 30% larger than the diameter of the first nip roll. To establish a *prima facie* case of obviousness, all claim limitations

Application No.: 10/002560

Case No.: 56911US002

must be taught or suggested by the prior art (see MPEP 2143.03). Thus claims 11 and 33 are not obvious in light of Braunshweig et al. and Harvey et al.

Claim 25 is rejected under 35 USC § 103(a) as being unpatentable over Braunshweig et al. in view of Chesley et al. (U.S. Patent 6, 579,162). Claim 25 ultimately depends on claim 23. Claim 23 has been amended, as explained above, to describe the cooled roll as having a diameter that is at least 30% larger than the diameter of the first nip roll to facilitate rapid cooling of the stem web. Braunshweig et al. does not teach or suggest the use of a cooling roll having a diameter that is at least 30% larger than the diameter of the first nip roll. To establish a *prima facie* case of obviousness, all claim limitations must be taught or suggested by the prior art (see MPEP 2143.03). Thus claim 25 is not obvious in light of Braunshweig et al. and Chesley et al.

Claim 32 is rejected under 35 USC § 103(a) as being unpatentable over Braunshweig et al. in view of Chesley et al. (U.S. Patent 6, 579,162). Claim 32 has been cancelled, thus obviating the rejection under 35 USC § 103(a).

In light of the arguments and amendments above, the rejection of claims under 35 USC § 103(a) has been overcome and should be withdrawn.

In view of the above, it is submitted that the application is in condition for allowance. Reconsideration of the application is requested.

Respectfully submitted,

July 12, 2004  
Date

By: Pamela L. Stewart  
Pamela L. Stewart, Reg. No.: 45,707  
Telephone No.: (651) 733-2059

Office of Intellectual Property Counsel  
3M Innovative Properties Company  
Facsimile No.: 651-736-3833